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NRCS ENGINEERING FOR TOMORROW -TODAY

SHARING TECHNOLOGY FOR QUALITY CUSTOMER SERVICE

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INSIDE

1998 NRCS Engineer of the Year

California State Conservation Engineer Charles Davis, PE, was honored as NRCS Engineer of the Year for 1998 in a ceremony at the Alexandria, Virginia, Crystal Gateway Marriot Hotel in February. The awards are sponsored by the Professional Engineers in Government (PEG) Practice Division of the National Society of Professional Engineers (NSPE). Engineers of the Year for each Federal agency or command are recognized annually during Engineers Week.

Charles has served as State Conservation Engineer in California for 10 years, prior to which he was State Design Engineer in California. He is recognized for his technical capability and outstanding leadership of the California engineering staff and of NRCS assistance in disaster recovery. Under his direction, California NRCS has been cited for excellence and teamwork in carrying out the Emergency Watershed Protection Program, receiving the Hammer Award, and USDA honor awards for service, performance and teamwork.

-Ron Marlow, NRCS, National Irrigation Engineer

Charles Davis, PE
1998 NRCS Engineer of the Year

EFTT returns

Engineering for Tomorrow Today (EFTT) returns with this issue. EFTT will be published at least three times annually. EFTT was conceived to share the technology, knowledge, experiences and news of NRCS engineers throughout the country. NRCS engineers can be justifiably proud of their team and individual innovation in meeting the conservation challenges facing us today. Please take time to submit articles on your projects, techniques, tools, success stories, lessons learned, awards, recognition and accomplishments.

-Dave Thackeray, National Civil Engineer

Construction mailing list

An e-mail list has been established for those involved in NRCS construction activities. This list will provide an avenue for sharing technical and administrative information related to construction across the nation. The list is open to anyone interested in this area. Construction Engineers, Project Engineers, Design Engineers, Construction Inspectors, Construction

NRCS Engineering for Tomorrow –Today is edited and distributed by the Conservation Engineering Division (CED) of the Natural Resources Conservation Service, U.S. Department of Agriculture. Send your articles on diskette through your State Conservation Engineer or Unit Engineering Leader to Dave Thackeray, NRCS, P.O. Box 2890, Room 6136S, Washington, D.C. 20013, or by e-mail to dthackeray@usda.gov. **View current and past issues on the WEB at: http://www.nhq.nrcs.usda.gov/ENG/eftt.htm**

Specialists and others are encouraged to subscribe and participate in this forum.

Mailing lists work by forwarding e-mail messages sent to the list to all subscribers to the list. You may post a particular question to the list and get several responses which may generate additional discussion.

Subscribing to the list is easy. Just send a message to the following address:

majordomo@ftw.nrcs.usda.gov

Leave the subject line blank and put the following in the body of the message:

subscribe constr "your e-mail address" (without the quotation marks)

You will then receive an introductory message from the list with further instructions. Future messages to the list will be sent to the following address:

constr@ftw.nrcs.usda.gov

if you have any questions about the construction mailing list you can contact Joe Freeland at 405-238-7371 or e-mail "freeland@telepath.com"

-Joe Freeland, Project Engineer NRCS,

CADD Corner

Standard Engineering Drawing Sheets

Bill Irwin and Dexter Case met with the National Production Services Staff, NPSS in Fort Worth, Texas in November 1997 to discuss preprinted standard drawing sheets and their future availability through their office. They have since worked with NPSS forms designer, Lisa Taylor, to develop two standard size drawing sheets (11" x 17" and 22" x 34"). These reflect industry standards, the new official NRCS logo, and a modified Type G title block. Other types of title blocks will no longer be supported. The Plain Plan (ENG-313), Plan with fade away blue grid (ENG-314), Cross Section (ENG-315), Full Profile (ENG-316), and Half Plan and Half Profile (ENG-317) sheets will be preprinted. The 22" x 34" size will be designated by a number only, while the 11" x 17" size will carry an "A" (i.e. ENG-313 or ENG-313A). These new sheets will be available from NPSS when their next order is printed. Electronic CAD files for the new title blocks have been created by Jim Light and Scott Webster in Phoenix, Arizona. The files are posted on the Arizona FTP server and are available in AutoCAD DWG format. To download the files through the Internet:

- Goto **http://az.nrcs.usda.gov**
- click on **Technical Resources**
- click on **Design Drafting Resources**
- chose either **AutoCAD 13 or AutoCAD 14**
- **follow directions** for downloading and decompressing the files

National Standard Drawings

We are in the process of scanning our agency's National Standard Drawings. We expect to make them available on CD-ROM for distribution to the States in the near future. Bill Irwin and Dexter Case sorted through the old paper drawings to come up with a full set of the standards. Some of these are the original ink on linen drawn over 40 years ago. These paper drawings are being housed and managed by Cartographic at Fort Worth, Texas. You may continue to request paper copies from them. A few of the drawings were scanned using various file formats and a sample CD was made for testing purposes. Several States and IRTs experimented in bringing up the sample files in CAD. It was found that LZW (a compressed TIF file only about one fifth the size of a TIF) is the most feasible output format for the scanned files. LZW can be imported directly into AutoCAD as a TIF file. It was also found that the most feasible output resolution for the scanned drawings is 250 dpi. This resolution is good enough that when plotted on a good quality ink-jet plotter, the drawings can be used in design and construction plans. The plots are actually better than most blue line copies previously used for this purpose. Some samples of these standard drawings are posted on Fort Worth's FTP server. To download these through the Internet, Goto "**ftp://ftp.ftw.nrcs.usda.gov/pub/scanner_test/std_drwg/**". These files are raster images and no plans have been made to vectorize them at this time. There still is no quick way to convert raster to vector. Conversion software is available, however the editing required after conversion is just as time consuming as tracing or redrawing. Some of the standards were previously redrawn by the States as they needed them. Hopefully, these and future conversions will be posted by the States for access to the entire agency.

-Dexter R. Case, National CADD Coordinator, Beltsville, Maryland

Technology

The Dollar Value of NRCS Engineering and Soils Technology

Ever wonder what some of the NRCS soils and engineering products and tools are worth in the market place? Barbara Fecso, Ph.D. (Economist), NRCS Program Analyst, Washington, DC, recently completed a benefits-cost analysis of the SITES program (formerly DAMS2), National Engineering Handbook on Irrigation, Agricultural Waste Management Field Handbook, Technical Release 55, Practice Standards and Specifications, Ohio Engineering Tools, and the Soil Survey. The results may astonish you. The following is the Abstract from her paper (in press), "Monetary Benefits of Some Popular Natural Resources Conservation Service Technology".

"To justify increased support for the Natural Resources Conservation Service (NRCS) technological

development and maintenance, an analysis was performed to estimate the monetary benefits to society gained from the use of NRCS information and modeling tools. Due to NRCS interacting with its partners, it is estimated that the technology gathered, developed, and disseminated by the NRCS generates $1.7 billion per year in benefits, with a range of $1.3 to $2.1 billion. The benefits result from cost savings due to avoiding excess construction or repair costs in dams, spillways and other water management system designs, from avoiding replication of effort by providing a national set of reliable standards, specifications, engineering handbooks and tools; and from providing and maintaining a trustworthy set of soil maps for the Nation. In most cases, the benefits accrue to the general public in the form of waste reduction, both monetary and physical. These benefits were based on computations using estimates from several case studies where NRCS technology was employed. While the agency produces a wide range of technical materials, it is believed that these seven tools alone more than justify the annual budget of the agency.

"Over the years, these products have been adopted worldwide for purposes ranging from basic home gardening to complex engineering and water management practices. Because these were public goods and therefore, not copyrighted, many private firms copy, alter and sell the technology for profit. Furthermore, other public entities such as conservation districts and universities use NRCS technology for business or educational purposes. In essence, the agency's investment in technology, spread in such a way, has leveraged an unknown amount of dollar benefits worldwide. Because it is infeasible to track the widespread use of our technology, the $1.7 billion per year value is considered an understatement."

-Barbara Fecso, Phd
Washington, DC

Awards

Henry Fisher Honored by ASTM

Henry Fisher, NRCS State Geologist, Columbus, Ohio, was the recipient of the prestigious A. Ivan Johnson Award of the American Society for Testing and Materials (ASTM) at its Summer Meeting in Atlanta, GA on June 15, 1998. ASTM is one of the largest voluntary standards development organizations in the world. ASTM is made up of volunteers from industry, government, and academia who develop consensus standards for materials, products, systems, and services. The NRCS uses several hundred ASTM standards in a wide variety of conservation engineering activities and products that relate to soil, rock, and surface and ground water.

The A. Ivan Johnson Award is presented to a member of ASTM Committee D-18 on Soil and Rock whose efforts have produced a particular outstanding result or significant contribution to the work of D-18. This award, established in 1979, was renamed in 1985 to honor A. Ivan Johnson for his 50 years of outstanding service and leadership to Committee D-18 and ASTM. The award is Committee D-18's second highest that is bestowed upon a member.

Henry has been a member of ASTM Committee D-18 on Soil and Rock for 10 years. He was instrumental in forming a new Subcommittee, D-18.17, Rock for Erosion Control. Under his leadership the subcommittee developed seven new ASTM standards, three of which Henry was senior author, and held one symposium on rock for erosion control. Henry also chairs the Section on Gabions, Subcommittee D-18.25, Erosion and Sediment Control Technology, and Subcommittee D-18.93, Terminology for Soil, Rock, and Contained Fluids.

- John Moore
National Hydrogeologist
CED Washington DC

On The Web

Scope and Effect Internet Site

The Wetland Science Institute (WLI) established a cooperative project agreement with the Agricultural Research Service's National Sedimentation Laboratory (NSL) in Oxford, MS. Part of this project agreement involved determining the interactive capabilities of the Internet by developing a site containing one of the Hydrology Tools for Wetland Determination from the recently published Chapter 19 of the Engineering Field Handbook.

An Internet site with the Scope and Effect equations programmed for use without downloading has been developed through this cooperative agreement. The equations can be accessed at

http://www.sedlab.olemiss.edu/java/tools.html

The term "Scope and Effect" is used to describe an analysis of the areal extent and magnitude of the effect of activities such as ditching, tiling, diking, etc. on the site hydrology. Scope and Effect equations are used to determine whether existing drainage systems (or planned installations or maintenance) are sufficient to remove wetland hydrology from a site.

While numerous water table drawdown equations are available, four have been determined to be applicable in evaluating a site for wetland hydrology. These equations are the Ellipse equation, the Hooghoudt equation, the van Schilfgaarde equation and Kirkham's equation (for ponded conditions). The appropriate equation(s) must be selected for the site conditions to be evaluated. A full description of the equations and their use can be found on the Internet site by clicking on the "About" button.

The Internet site is interactive so that the input data is entered directly and the result is calculated on screen without having to download the program (the program runs on the server). The results can be printed for documentation purposes. Additional Hydrology Tools for Wetland Determination will be added to the site in the future if this technology transfer process proves successful and there is interest by field personnel (ex. regional teams, state offices, and field offices) in developing additional applications.

One advantage of this form of technology transfer includes the elimination of the need for various staff across the country to perform the same programming, reducing staff time requirements and costs. This also greatly reduces the opportunity for programming errors. Also, by having the programming reside at one location on the Internet, the programming can be updated instantaneously for all users without the cost and delays of hardcopy distribution or individuals having to download updated versions. The problem of compatibility is eliminated by having the software execute from a central server. Anyone with Internet access and a recent version of the most popular browsers can access the programming. Downloadable programs require software and operating system compatibility. This site is compatible with the NRCS approved Internet browser.

Since consistency of application is an issue, by providing one methodology and one program to perform the task, consistency among agencies and across geopolitical boundaries is obtained. Local guidance and variability is still present in the input variables and the determination of which, if any, of the scope and effect equations are to be applied in a state or region.

NRCS State Conservation Engineers and associates

-Reno, Nevada, October 9, 1998

Application Example

The Ellipse equation may be used where wetland hydrology is the result of a high water table with a restrictive soil layer and the hydrology has been (or will be) altered with drains (surface or subsurface). If lowering of the water table for specified duration is all that is required to define wetland hydrology, then the ellipse equation is satisfactory to approximate this situation.

For Additional Information Contact:

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-Paul Rodrigue, Wetland Hydrologist, WSI, Oxord, MS

SCE/SRC Meeting held in Reno

The first combined meeting of State Conservation Engineers and State Resource Conservationists was held in Reno, Nevada, October 2-9, 1998. The meeting, hosted by NRCS Nevada and California, featured facilitated discussion of technology development, transfer and training issues, poster sessions displaying products and services of NRCS Institutes, Centers, and others.